

have that regular tricuspid division of the crown which is first observed in the genus *Amphilestes* of the English Lower Jurassic and characterizes a large number of the Jurassic mammals.

#### EXPLANATION OF PLATE.

Figure 1. *Microconodon tenuirostris*. The outer surface of the right mandibular ramus, enlarged. The two premolars preserved are the first and third, with the fang of the second between. The space behind the third was occupied either by a fourth premolar and the first molar, or by the first and second molars. The molars preserved are, therefore, either the second and fourth, or the third and fifth. The dotted outlines are purely conjectural.

1a. The same, natural size.

1b. The fourth or fifth molar, much enlarged.

Figure 2. *Dromatherium sylvestre*. The inner surface of the left mandibular ramus, enlarged.

2a. The same, natural size.

2b. The second molar, much enlarged.

#### ABBREVIATIONS.

a. Angle ; c. canine ; cn. condyle ; cr. coronoid ; i. incisors ; mg. mylohyoid groove ; m. molars ; p. premolars.

#### *The Relation of Aerolites to Shooting Stars.*

*By Professor Daniel Kirkwood.*

(Read before the American Philosophical Society, April 15, 1887.)

The writer more than twenty years since gave reasons for believing that shooting stars, fire balls and meteoric stones move together in the same orbits.\* The facts then collected were deemed sufficient to sustain the theory advanced, or at least to give it a high degree of probability. This view has been rejected, however, by several eminent astronomers, and especially by the present Astronomer Royal for Ireland, the distinguished author of "The Story of the Heavens." He remarks: "It is a noticeable circumstance that the great meteoric showers seem never yet to have succeeded in projecting a missile which has reached the earth's surface.

\* Meteoric Astr., Chap. v.

Out of the myriads of Leonids, of Perseids, or of Andromedes, not one particle has ever been seized and identified. Those bodies which do fall from the sky to the earth, and which we call meteorites, never come from the great showers, so far as we know. They seem indeed to be phenomena of quite a different character to the periodic meteors" (Story of the Heavens, p. 349).

In pointing out the coincidence in the epochs of shooting stars and meteoric stones,\* the present writer neglected to assign an obvious reason for the fact that star showers are so seldom observed at the same time with the fall of aerolites: a majority of the latter have been seen in the day time, when ordinary shooting stars would be invisible. At night, however, the phenomena have more than once occurred at exactly the same time. The writer called special attention to one of these epochs as long since as 1881.† In describing the shower of April meteors as it occurred in the year 1094, the historian says: "At this period so many stars fell from heaven that they could not be counted. In France the inhabitants were amazed to see one of them of great size, fall to the earth, and they poured water on the spot, when to their exceeding astonishment, smoke issued from the ground with a hissing noise."‡ A few other examples are given below:

(1.) During the meteoric display which continued through three consecutive nights in the latter part of October, A. D. 585, a globe of fire, sparkling, and producing a great noise, fell upon the earth.§

(2.) A simultaneous fall of aerolites and shooting stars is indicated by the phenomena of 1029, as described in the catalogues of Herrick and Quetelet.

(3.) But without quoting other records which imply the existence of aerolites and ordinary meteoric matter in the same streams or clusters, it is sufficient to refer to the recent and very decisive phenomena of November 27, 1885.¶ During the periodic star shower from the fragments of Biela's comet a mass of meteoric iron weighing about ten pounds was seen to fall near Mazapil, Mexico, in lat.  $24^{\circ} 35' N.$ , long.  $101^{\circ} 56' 45'' W.$  from Greenwich. The evidence afforded by the phenomena of 1094 and 1885, apart from the other cases cited, renders the coëxistence of large and small masses in the same meteoric streams almost infinitely probable.

\* Metr. Astr., pp. 58-64.

† Science, Feb. 5, 1881, p. 59.

‡ Am. Journ. of Sci., Jan., 1841, p. 356.

§ Quetelet's Physique du Globe, p. 291.

¶ Am. Journ. Sci., March, 1887, p. 221.